

Preface

*For every complex problem there is an answer
that is clear, simple, and wrong.*

H.L. Mencken

In our combined 80+ years of working in PK–12 schools in 45 states, one factor remains clear to us: School personnel have given far more thought and attention to scheduling middle and high schools than elementary schools. Elementary schools have escaped much of the national scrutiny and the resultant criticism heaped upon secondary schools in such reports as *A Nation at Risk* (National Commission on Excellence in Education, 1983), *Prisoners of Time: Report of the National Education Commission on Time and Learning* (1994), and *Breaking Ranks: Changing an American Institution* (National Association of Secondary School Principals, 1999). While a proposed change to a high school schedule can bring out the fighting spirit of teachers, parents, students and school board members, the fact that one third grade teacher routinely instructs science far less than other third grade teachers in the same elementary school often goes unnoticed.

Sadly, it is not unusual to find elementary schools that do not even have a master schedule. Yes, most schools have a lunch schedule and schedules for physical education, art, music, and other “specials,” but too often the schedule for language arts and reading, mathematics, social studies, science, and the many sup-

port programs provided for students is constructed haphazardly by teachers working in isolation—private contractors without the global vision of the school’s mission that should guide the allocation of time and resources. Too often teachers with the most power—sometimes based on seniority, parent support of special programs, and assertive personalities—end up with preferred schedules.

Since the mid-1960s, elementary schools have added significant numbers of personnel; in one count we found that staff had increased over 50 percent. In some cases these additional resource and support personnel have been used effectively; however, we also have noted that in schools without well-crafted schedules, resource personnel are not well integrated into the instructional program and often are treated as add-ons. With this situation, support personnel compete with classroom teachers for access to students and rarely achieve their potential positive impact on student achievement.

As we have stated previously in our books on high school scheduling (Canady & Rettig, 1995) and middle school scheduling (Rettig & Canady, 2000), we continue to believe that school scheduling—high, middle, *and* elementary school scheduling—is far more important than the simple mechanical assignment of students to teachers, spaces, and time periods. Within the school schedule resides power: the power to address problems and the power to facilitate the successful implementation

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of effective instructional practices. As well, those who have the responsibility for the school schedule also have the power to create confusion, to waste resources, and to cause unnecessary stress for all who work in the school.

In no way do we mean to imply that by simply implementing the scheduling strategies offered in this book that higher levels of student achievement automatically will result. Significantly increasing student achievement depends primarily on quality teaching. We can say with confidence, however, that implementation of these scheduling strategies can

- ◆ reduce fragmentation of the school day for both teachers and students;
- ◆ reduce conflict and frustration among core, support and encore teachers;
- ◆ offer equity to *all* students and teachers in the school;
- ◆ capitalize on the potential of time as a variable that can impact student achievement;
- ◆ build efficiency into the school day;
- ◆ harness the power of professional learning communities to support school improvement; and
- ◆ institutionalize generally accepted research-based principles of quality instruction including the following:
 - increasing the amount of instructional time for some subjects and/or for some students;

- reducing class size during key instructional activities;
- using formative assessment techniques to monitor students' learning; and
- providing team-based, data-driven intervention, enrichment, and tutoring services during the school day.

We believe it is important that principles of quality instruction be institutionalized into practice so they can be evaluated and changed if they are not working successfully. One way to support the institutionalization of a good practice is to build it into the schedule! Nearly all educators agree that raising expectations for students without increasing the support they receive is a recipe for failure. Similarly, increasing expectations for teachers without providing support is a formula for stress and eventual burnout. By implementing many of the scheduling strategies presented in this book we support teachers' efforts; quality instruction for *all* students is left less to chance.

The mission of elementary schools in our society has changed little over the decades; elementary school personnel seek to build basic skills in literacy, numeracy, science, social studies, the arts, wellness, democratic ideals, and civility. What has changed, however, is the realization of the importance of achieving this mission for *all* children. In our work, we have had the opportunity to visit schools across our country at all levels: elementary, middle, and high school. When we witness staggering numbers of high school students failing math and English, giving up on school because they cannot read, write,

or think mathematically, we know the roots of these problems were established earlier in their schooling. All of society pays a high price for this failure.

We believe that the elementary school is possibly the most critical institution in our society: the invisible backbone of our democracy. Of all the levels of schooling, the elementary school has the best chance of erasing the quality gap that exists for many children in terms of healthcare, parenting, and readiness to begin school. In essence, elementary schools hold the primary ticket to a better life for millions of children. Today, students who leave the elementary grades without sufficient skills to succeed in future years of schooling pose serious problems for themselves and society. The stakes are too high to allow this to continue. The goal of this book is to make elementary schools more efficient and effective for both teachers and students.

As Mencken's quote to begin this preface suggests, the solutions to the problems facing elementary schools today are complex. For that reason this was not an easy book for us to write; we began more than five years ago. We suspect, too, that a book with more than 100 schedules illustrated and explained will not be an easy book to read. For readers willing to rise to the challenge of that task, we hope you find our efforts worth your effort.

Finally, we invite your comments and suggested improvements. We, too, are still searching for ways to organize and schedule elementary schools so they can become more efficient and successful places for teaching and learning for *all* teachers and *all* students.

Lynn and Mike
May 2008

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Note

The figures in this book show the school day divided into 5-minute increments. The printing process does not allow us to print the time in every 5-minute slot clearly. We do print the time each hour; times printed refer to the line to the left. The CD-ROM that accompanies this book, however, does have times printed every 5 minutes. When printed on an ink-jet or laser printer, these charts will be clear. Because many of the full-page figures have been placed at the end of each chapter, we suggest that readers consider reading the text in the book while viewing the figures on a computer to avoid flipping back and forth between text and figures.

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The Case for Building Master Schedules in Elementary Schools

Educators in elementary schools today are under tremendous pressure to increase student performance, most often measured by test scores in reading and mathematics. In fact, raising test scores has become a prime-time national news item and a topic on the agendas of local, state, and national officeholders alike.

With a major focus on increasing student achievement and the accompanying accountability issues, scheduling strategies that can help elementary teachers maximize both instructional time and resources are critical to major school reform efforts. This book explains and explores our belief that scheduling is an untapped resource for enhancing instructional time and learning in elementary schools. From our 80+ years of study and educational experience, we have drawn the conclusion that a well-crafted elementary schedule that effectively uses time, space, and resources can

- ◆ improve the quality of school time;

- ◆ reduce problems associated with various pull-out programs;
- ◆ decrease class size during critical instructional periods;
- ◆ allow for temporary, flexible instructional groups based on what and who is being taught; and
- ◆ provide varying amounts of time for students to learn based on their individual needs.

While simply rearranging the bells in a school will not automatically increase student achievement, the school schedule is a significant factor in determining how successfully teachers work with students between the bells. The school schedule is a powerful tool for addressing problems and for facilitating the institutionalization of effective instructional practices. An ill-crafted schedule often results in fragmented and frequently interrupted instructional time, wasted time and resources, and unnecessary stress for both students and teachers.

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In our experience, elementary personnel have not been too concerned with scheduling. Pre-service or potential elementary principals typically spend little time and study related to the topic of scheduling. Principals often delegate the responsibility to a teacher or two (often specialists, such as physical education, art, or music). Although middle and high schools generally spend considerable time and effort creating some type of schedule to guide people through the day, it generally has been assumed that if the elementary teacher had a class of no more than 25 students (now some are saying 20) and if they could get to lunch, PE, art, and music on time, all was right with the world!

We argue otherwise. The creation of an effective school schedule is a key component of every elementary principal's work. Even though many different personnel should be involved in the process, to delegate this responsibility is to abdicate the role of instructional leader.

This chapter briefly outlines several problems we have identified with typical elementary school schedules, ponders the causes of these problems, and suggests several general principles for designing effective elementary school schedules.

Problems with Current Elementary School Schedules

When *Prisoners of Time* (National Education Commission on Time and Learning, 1994) was published, a great deal of attention was focused on how secondary schools used time. The problems and foibles of the high school schedule were put under

the microscope. Elementary schools escaped this scrutiny largely because the self-contained classroom with the teacher in control of school time was so pervasive and had been accepted without question. We do not accept this model without question. At least in high schools and middle schools we know where the time goes; there is a school-wide master schedule. When the schedule states that students are in an English class for 45 or 90 minutes (whatever the period or block length), one generally can assume that some kind of instruction in English will occur at that time. No such assumption can be made for the use of time in elementary schools, where individual teachers decide what's appropriate. We believe that accountability for the use of time in elementary schools has been spotty at best, and that this issue warrants careful examination. In the sections that follow, we discuss several common problems, including the following:

- ◆ the inconsistent allocation of time to subjects both within and across grade levels;
- ◆ the fragmentation of instructional time;
- ◆ the difficulty of providing institutionalized time for intervention, remediation, enrichment, and special services;
- ◆ the lack of common planning time for teachers during the school day;
- ◆ the mismatch between needs and resources; and
- ◆ the mismatch between teaching skills and teaching assignments.

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Inconsistent Allocation of Time

How should time be allocated in elementary school? How should time be allocated at each grade level? These basic questions rarely are discussed, although they must be answered before an appropriate school schedule can be constructed.

Most decisions regarding the allocation of time in elementary schools (except for lunch and encore¹ classes) are at the discretion of individual teachers, who vary greatly in their philosophies regarding time usage. Some focus much of their efforts on language arts and to a lesser extent on mathematics, with little or no instruction in social studies and/or science. It is not unusual to find one third grade teacher in a school who provides 30 minutes of science *daily*, and another who provides 30 minutes of science *weekly*. Therein lies a major problem with elementary school schedules; the curriculum students receive and how much time is spent on each subject should not depend on the teacher's preference. Thoughtful discussion should guide a school or district to allocate time in accordance with its mission and then guarantee that the same allocation occurs across all similar classes and schools.

Fragmented Instructional Time

Many elementary school schedules are plagued by the fragmentation of core instructional time for classroom teachers, who are confronted with a situation in which students who receive special services come and go all day long and the scheduling of encore classes also chops up the instructional schedule. We heard from one teacher in Arizona who stated that she had 132 separate occasions during the week when students receiving special services either departed from or arrived at her classroom, and only two hours weekly when her entire class was scheduled to be there!

The encore schedule likewise contributes to the fragmentation. We worked in one district in which physical education classes were 45 minutes twice weekly for grades 3–5 and 30 minutes three times weekly in grades K–2, and music was 25 minutes twice a week in grades K–2 and 45 minutes once a week in grades 3–5. The schedule for art classes showed similar variations.

When encore teachers' schedules are combined with special service teachers' schedules, regular classroom teachers become traffic directors, ushering groups from one place to the next—rarely having the entire class in attendance and forced to plan instruction around the remaining fragmented time in the

¹ We define “encore” as those classes that are taught by a specialist in the field and that all children receive, such as physical education, art, music, library-media, foreign language, computers, and so on. Typically, when these classes meet, the base teacher has a planning period. Often such activities have been called “specials.” Many instructors of these classes have objected to this title because it implies something extra and, there-

fore, expendable. We agree; however, encore teachers often have been their own worst enemies by advocating scheduling accommodations that force base teachers to plan core instruction within short, fragmented periods of time. While respecting the preferences of encore teachers, schools still must design schedules that insure that their primary mission is implemented effectively. Such a plan will require compromise.

school day. This frustrating circumstance often results in a diluted sense of accountability and efficacy—teachers rationalize, “If I don’t have my kids, I can’t very well teach them, can I?”

Even though each self-contained teacher will struggle to plan basic instruction around such a schedule, it becomes nearly impossible to find blocks of time when all teachers at a grade level have concurrent uninterrupted instructional time to allow teaming and regrouping of students. When one teacher has her class, another teacher’s group may be in music, or several students from a third teacher’s class may be receiving extra reading instruction.

Difficulty of Structuring Time for Intervention, Remediation, Enrichment, Special Services

The recipe for students’ successful learning includes a continuous cycle of teaching, assessing, and re-teaching, a challenging task for individual teachers to accomplish on their own with a class of 25 very different students. In fact, it was the difficulty of meeting this challenge that doomed the Mastery Learning and Outcomes-based Education movements of the 1970s and 1980s to the junk-heap of discarded education change efforts. Our current “standards-based” educational environment differs from these past programs only in that high-stakes accountability measures have been added as motivation for making the system work. Consequently, there now is great interest among educators in finding time to remediate long-term learning deficits, to intervene quickly when students don’t grasp concepts after initial instruction, and to provide enrichment for those who do. However, the basic problem of providing

remediation, intervention, and enrichment remains the same as with these past efforts: How can one teacher possibly address all three modes of instruction at the same time? It was impossible for all but the most gifted teachers in the past; why should it be any easier now?

Perhaps the most critical (and unresolved) time allocation issue is the indisputable fact that some students need more time to learn than others. In this age of accountability, when all students are expected to achieve a high level of content mastery, how do we provide more time for those who need it? In elementary schools, our usual response is to provide individual assignments to those who learn quickly, and to regroup, slow down, and provide pull-out programs for those who need more time. The problems with these accommodations are that sometimes the “individualized” activities are thrown together haphazardly (Renzulli, 1996), students placed in slower groups fall farther behind, and that pull-out programs often are poorly integrated with classroom instruction that also stigmatize students who are involved in them (Hopkins, 1990).

Lack of Common Planning Time for Teachers During the School Day

To accomplish the important work of data analysis, curriculum management, lesson study, instructional improvement, and formative assessment design, in addition to the planning required to support the system of remediation, intervention, and enrichment discussed above, professionals must have time to collaborate. This collaboration is difficult to accomplish before school, when preparing for the day’s instruction is the main focus. It is equally difficult to accomplish at the end of a tiring

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day, when out-of-school family responsibilities await. Professional learning communities of teachers must have common planning time during the school day to engage in this work; many still do not (Dufour & Eaker, 1998).

Mismatch Between Needs and Resources

The primary mission in elementary school is literacy and numeracy. Why, then, do we most often present reading and math instruction with the very same class size as physical education, music, art, or even science and social studies classes? Shouldn't our resources follow our needs? Why is it that in some districts, a school with 400 students will have a full-time art teacher—and so will a school of 200? Shouldn't we distribute resources of time and talent in a pattern that reflects needs rather than tradition and simplicity?

Mismatch Between Professional Teaching Skills and Teaching Assignments

We often have mused that the perfect elementary school schedule would include self-contained classes staffed by Renaissance teachers, knowledgeable and skillful in all areas. If base teachers were all equally talented, we wouldn't need encore and special service teachers, and we could lower class size to 10:1. Until we reach this utopian state, however, why not recognize that different teachers have different strengths and utilize them accordingly? If one of the four first grade teachers has a master's degree in reading and is a superstar literacy teacher whereas another is very strong in math or science,

wouldn't it be wise to expose every child to both instructors? Often principals know a teacher is weak in a particular subject, yet students must be assigned to that teacher for that subject—and suffer through a year of questionable instruction. While we agree that the evaluation system should address the issue of incompetent teachers, we also believe in assigning teachers according to their strengths.

Causes of Elementary School Scheduling Problems

The problems discussed previously spring primarily from one factor: Most elementary schools do not construct a master schedule that delineates when all instruction will occur. Generally, the only classes scheduled on a school-wide basis are encore classes, lunch, and recess. Consequently, much of the school schedule is created by independent contractors (classroom teachers and special service providers), usually with very little consultation with other instructors their decisions might affect. Without a school-wide plan for the use of time, our traditional practices for scheduling encore classes and special services cause a host of problems.

Lack of a Master Schedule

A major problem with elementary school scheduling is that those who construct the schedule do not take a school-wide view. Encore teachers' schedules are built with their needs in mind; individual teachers schedule with their preferences at the forefront. Little thought is given to overall school priorities. The

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program that students encounter is as fragmented as the decision-making process that created it.

Typically, individual classroom teachers have enormous latitude regarding their use of time. They are told when to go to lunch and when to send students to encore classes; otherwise, they often are free to schedule as much or as little specific instruction as they see fit. Consequently, the distribution of instructional time may vary widely even within the same grade level of a single school.

One of the attention-getters we often use with teachers in a schedule-building workshop involves this very issue. The first question we ask is “What time in the morning does school begin?” Pose this question in your school someday, asking teachers to think silently of their responses. Count to three, and then invite them to respond in chorus. You’ll probably hear three or four different times mentioned! Teachers invariably have different notions about when school actually starts, and these differences in opinion regarding time only multiply as you begin to discuss instruction.

To guide teachers in their first experience of building a master schedule, we first establish beginning and ending times, then calculate the number of minutes in the school day (e.g., 8:00 A.M. to 2:30 P.M. is 390 minutes). We post this number on the board. We then choose a particular grade level (say, third grade) and ask a teacher to respond to a few questions. “What is the first activity we should put on the schedule?” Teachers often jokingly call out “Lunch!” or “Planning time!” We then say, “Let’s start with our most important activity.” Consistently, language arts and reading top the list, but teachers differ greatly in the amount of time to allocate—in third grade, anywhere from 60

minutes to three hours daily. Once a time is agreed upon, we subtract it from the 390-minute total.

Mathematics typically is the next emphasis, and then social studies and science, encore classes, and, finally, lunch and recess. For each activity, we subtract the agreed-upon time allocation. Often we finish with a substantial amount of time left over, and teachers scratch their heads in disbelief, wondering, “Where did it come from?” Or they state, “Oh, that’s travel time, bathroom time, rest time, and so forth.” Other times, the total isn’t enough to cover all subject areas, and then teachers ask, “How am I ever going to fit everything in?”

We consider this to be an essential exercise for every elementary school staff. How should our time be used in school? Does our response differ for different grade levels or students with different needs? We argue for consistency within a grade level and a logical articulation between grade levels. Thus, it may be just fine for first grade teachers to spend more time on language arts and reading and less on social studies and science than fifth grade teachers, as long as they allocate time consistently within the grade level.

Moreover, these allocations should make sense as students move from grade to grade. It seems illogical to provide two-and-a-half hours of language arts instruction in first grade, 90 minutes in second grade, and then back up to two hours in third grade (unless there are idiosyncrasies in the state testing program).

We realize that the consistency we describe cannot and should not be etched in granite. Some students may need more time to learn key skills. For students in the primary grades who are having difficulty learning to read, we would be wise to focus

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much of their time in school on instruction in this area, while this may not be necessary for other students.

Finally, and perhaps most importantly, the amount of school time allocated to certain subjects is strongly related to student achievement in that area (Marzano, Pickering, & Pollock, 2001). It is important to have a thoughtful school-wide plan for the assignment of time in elementary schools. That is the primary purpose of constructing an elementary school master schedule.

Issues with Scheduling Core Instruction

The predominant elementary school scheduling structure for core instruction over the years has been the *self-contained classroom*, where each teacher was responsible for the instruction of all aspects of language arts, reading, mathematics, science, and social studies. In the self-contained classroom, teachers organized time as they saw fit around their encore, lunch and recess schedules. Again, if all teachers were Renaissance men or women, this would be the best of all worlds. Because all teachers are not skilled in all areas, a number of other scheduling structures have developed.

To address the difficulty of instructing a truly heterogeneous group of students, especially in reading and language arts (and to a lesser extent in mathematics), many schools have adopted some form of regrouping practice. The most common manifestation of this notion is *regrouping among homerooms at the same grade level* for reading and possibly language arts. Based on some criteria (such as basal reading level, test scores, individual reading inventory results, teacher judgment), students from sev-

eral classes at the same grade level are divided into more homogeneous learning groups. Each teacher in the grade level has responsibility for instructing one of these groups during a time block of 60 to 150 minutes, depending on the grade level.

Typically, in a grade level with three teachers and 75 students, one teacher might manage a group of 32 students, all of whom were reading on or above grade level; a second teacher might work with a group of 25 students, all of whom were on grade level; and the third teacher would instruct the remaining 18 below-grade-level readers. The primary purpose of regrouping is to reduce the number of different reading levels in the instructional group, thereby trimming prep time for the teacher. The same practice often is employed for mathematics, during a different time block and (hopefully) with different criteria for regrouping.

Because some students may be reading far above grade level while others remain far below, occasionally the regrouping structure expands to include multiple grade levels. *Regrouping across multiple grade levels*, also known as the Joplin Plan, offers a more precise placement of students on their instructional reading level (Cushenberry, 1967).

In the past decade, as states have developed accountability systems with subject-based assessments and as federal law (Elementary and Secondary Education Act, 2001) has required the implementation of such assessments, the practice of *departmentalization* at the elementary school has become more prevalent. This practice assigns teachers to their instructional strength and reduces the number of preparations required. In its simplest and most common form, two teachers exchange classes for science and social studies. The rest of the day might be self-contained,

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or this mini-departmentalization could combine with one of the regrouping practices discussed above.

As the number of teachers on a team increases, the variations of departmentalization also multiply. Note that when we decide to departmentalize, whatever subjects we include must receive equal time. Thus, if we have a three-teacher team and we decide to departmentalize for math, social studies, and science, each of these subjects would receive the same amount of time. The pros and cons of these options are discussed in chapter 5.

Similarly, there are a variety of core curriculum programs with specific time requirements. Success for All (Success for All Foundation, 2005) requires 90 minutes of uninterrupted reading time daily using the Joplin grouping plan. The Four-Blocks reading program (Cunningham, Hall, & Sigmon, 1999) requires 120 to 160 minutes daily that can be divided into four different blocks. Everyday Mathematics, developed by the University of Chicago Mathematics Project, requires an hour of time for mathematics daily (McBride et al., 2002).

Regardless of the scheduling option or the program format chosen, without a master schedule that carefully creates the necessary periods for core, encore, and special service instruction, teachers will struggle to implement any of these plans.

Another important scheduling consideration is class size. For the past three decades, researchers have studied the issue of class size and its relationship to student achievement. While lowering the pupil-to-teacher ratio is always welcomed by teachers and frequently touted by politicians, the goal seems always just out of reach. The research on this topic is very specific:

- ◆ There is little evidence that reducing class size to any number above 15 has a major impact on student achievement; that is not to say that such a reduction might not offer other benefits, such as a reduction in teacher stress, student stress, discipline infractions, or other factors.
- ◆ There is significant evidence that lowering class size to 15 or fewer students does increase students' achievement as measured by standardized tests; this is especially true in the primary grades, with minority and economically disadvantaged students, especially boys (Achilles, 1997; Achilles, Finn, & Pate-Bain, 2002; Robinson, 1990; Smith, Molinar, & Zahorik, 2003; Wenglinsky, 1997).
- ◆ There is evidence that achievement benefits persist into later years of schooling if students remain in smaller classes for at least three years (Achilles, Finn, & Pate-Bain, 2002; Finn, 1998; Nye, Fulton, Boyd-Zaharias, & Cain, 1996).

Consequently, lowering class size, especially in the primary grades, has become a major political issue during local, state, and national "save public education" budget debates. Threats of increasing class size can stir up political passions. The issue intuitively makes sense to educators and the general public. We believe, however, that our nation is unwilling to devote the monetary resources necessary to achieve homeroom classes of 15 or smaller.

Reducing class size has what we call a multiplier effect. Because the homeroom remains the primary scheduling unit in

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elementary schools, smaller class size means hiring more teachers—but that is not all. Each new teacher requires a classroom. Each new classroom group requires scheduled periods in art, music, physical education, and other special activities, which may result in additional hiring and space needs.

Furthermore, we consider it wrong-headed to focus on smaller homeroom classes. If we accept the research, we must accept the fact that this will not automatically boost student achievement. To pursue that goal, elementary schools must give greater attention to varying the size of instructional groups based on what is being taught. Do schools really need (or can they afford?) physical education classes, music classes, recess, and story hours with fewer than 15 students?

What teachers really need are reading and math groups with fewer than 15 students. They need flexible scheduling strategies that enable them to alter the size and composition of instructional groups based on the day's instructional goals and varying student needs. Chapter 6, which addresses parallel block scheduling, offers such a plan.

Issues with Scheduling Special Services

The scheduling of instruction provided by teachers other than the classroom teacher has developed somewhat haphazardly over time. While a considerable number of programs and personnel have been added to elementary schools during the

past 35 years, no master plan has governed their inclusion in the school day. At first, these programs were welcomed with eager and open arms. One assistant superintendent, when notified in 1965 that the Elementary and Secondary Education Act would bring federal funds to her school district, remarked, “We finally have an answer to educational problems; now we’ve got to think about how we are going to spend it.” The district decided to use these first Title I funds to provide pull-out programs for disadvantaged students. Someone undoubtedly took the reins of this program and became an advocate for it.

In 1975, when PL 94–142 (Education for All Handicapped Children Act) mandated a free and appropriate education for students with disabilities, another professional had responsibility for implementing the program. These two committed educators each had their own vision; rarely did they work together to determine how best to implement both programs, or how each affected the other. Since then, schools have added programs for bilingual and English as a Second Language (ESL) students, gifted and talented students, and children of migrant workers. Some schools also have offered instrumental music lessons and sundry other special services— all for laudable purposes, but all without a master plan.

Haphazardly scheduled pull-out programs,² such as special education and talented and gifted services, can disrupt instruction for all students in the classroom (Achilles, Finn, & Pate-Bain, 2002; Hopkins, 1990; Hopkins & Canady, 1997). Unfortu-

2 We define pull-out programs as programs students must qualify for or choose, such as Title I, special education, English as a Second Language, gifted and talented, migrant education, instrumental music, and so on.

nately, many schools still resort to what we call the “When can I have your kids?” model of scheduling for special services programs. All too often, elementary school specialists build their own schedules. Upon receiving her list of eligible students at the start of the school year, the teacher of students with learning disabilities meets with each homeroom teacher to schedule contact time. If—as often happens—she starts with the teachers with whom she already feels comfortable, those teachers get the “preferred” times.

On the surface, building her schedule student by student and class by class seems reasonable, flexible, and highly individualized. But in many cases, the teachers of Title I, speech and language, ESL, gifted and talented, and instrumental music programs follow the same procedure. When all is said and done, the schedule resembles a crazy quilt, with no apparent rhyme or reason.

Issues with Scheduling Encore Instruction

Even if not scheduled independently by their teachers, art, music, PE, and the like may contribute to the fragmentation of instructional time. Problems ensue when different encore classes take periods of different length, when encore teachers insist on consecutive classes for the same grade level, when a school relies totally on a Monday to Friday scheduling format, and when allocations of itinerant teachers from the central office do not fit with the school’s needs.

Different Length Class Periods

It is not unusual for an elementary school teacher’s class to have physical education three days a week for about 30 minutes, art once a week for 50 minutes, music two days a week for 20 to 40 minutes, and library class for 40 minutes—each in its own time slot. How does this scheduling mess come about?

In a way, it makes sense. Elementary students, some argue, do have a short attention span and need frequent physical activity, as the PE teacher asserts. Art teachers do need time to distribute materials at the start of class and clean up at the end. Principals do want to respect and respond to encore teachers’ individual needs. But the pieces of the puzzle don’t fit together very well, and core classroom teachers face the impossible task of filling in the gaps with effective core instruction.

Scheduling Classes of the Same Grade Level Consecutively

A music teacher’s request to instruct the three grade 1 classes in consecutive half-hour sessions because that makes planning and materials preparation easier seems quite reasonable. An art teacher can logically ask for the same consideration. But scheduling encore classes this way has two negative consequences. First, it becomes impossible to schedule common planning time for base teachers at the same grade level; they simply never have the same encore/planning time. Second, it becomes more difficult to schedule time for regrouping or mini-departmentalization, because one section or another will probably be unavailable.

Scheduling with a Monday-to-Friday Mindset

As a classroom teacher, did you ever have an art class scheduled for Friday or Monday? Not surprisingly, your students had fewer art classes than students scheduled for art on Tuesday, Wednesday, or Thursday. Why? Because more holidays, teacher in-service days, and workdays fall on Friday, and Monday comes in second. This means less planning time for you (art classes are often the longest planning periods for classroom teachers) and less art for your students. Monday-to-Friday schedules are inherently unfair, yet we persist in scheduling art, music, computers, PE, foreign language, and a host of other specialized elementary school classes based on the days of the week.

Similarly, the most common sharing arrangement for itinerant specialists is 50 percent in one school and 50 percent in another. This typically translates into two and one-half days in each school—not only a nightmare to schedule, but also a waste of resources, because instructional time is lost and expenses must be paid for travel between the two schools on the shared day. In chapter 3, we suggest encore teachers' schedules that operate on three-, four-, six-, or eight-day cycles, and even by semesters, which are far more equitable and efficient than the traditional Monday-to-Friday plans.

Allocations of Itinerant Teachers from the Central Office

Have you ever worked in a school where teachers had two planning periods on one day and no break at all on another? Ever wonder why? When smaller schools need less than full-time encore staffing, or when larger schools need some additional

encore staff, a practical solution is to share staff between one or more schools. More often than not, a central office administrator assigns these itinerants. Occasionally, the music supervisor assigns music staff, the physical education supervisor assigns PE staff, the art supervisor assigns art staff, and none of them talks to the others! Little wonder a school ends up with three encore teachers on one day of the week and none on another day, giving the base teachers a lopsided planning schedule.

Six Key Principles of Elementary School Scheduling

We have distilled six principles that should guide elementary school scheduling: focusing on the mission, school-wide scheduling, collaboration, practicality and appropriateness of teaching assignments, fairness, and efficiency.

Focusing on the Mission

Schedule design should be mission driven. Just as a school's mission statement should guide all major decisions regarding budget, program, textbooks, and instruction, so should a school's mission guide the design of the school schedule. Our value for a particular subject or activity is manifested on the schedule in the following ways:

- ◆ by the amount of time we provide for the activity;
- ◆ by the time period during the day when we schedule it;

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- ♦ by its relative class size limit; and
- ♦ by the space we assign for it.

When we look at school schedules from across the country, we can tell what is valued most highly. Elementary schools, especially in the primary grades, spend two to two-and-a-half hours a day on language arts and reading because they regard it as the most important activity. A third grade teacher who allots 30 minutes a week to science evidently considers its value low. First grade teachers fight tooth and nail to instruct reading in the morning, because (whether true or not) they believe morning is the best time to teach reading. Teachers rarely want encore classes first thing in the morning, which says something about the value of encore classes in their minds.

When we schedule five students to work with the teacher of the gifted and put 25 students in the low math group with another, we, too, express our value for these activities. Finally, when we rewire a classroom for the Internet, equip it with 30 state-of-the-art computers and then relegate the self-contained special education class to the mobile classroom behind the building, we express our value for the activities that unfold in these spaces. Each individual scheduling decision expresses our values.

We understand that the principal and teachers are not the only ones who influence the schedule; school board policies, state and federal regulations, parental pressures, and even tradition also factor into these decisions. Nevertheless, we argue that the amount of time spent in a subject, its strategic placement in the schedule, the size of the instructional group, and the space

assigned to a particular activity should be guided by the school's stated mission.

School-wide Scheduling

School schedules should be designed with the big picture in mind. As previously discussed, core classes, special services, the arts, and PE cannot be scheduled effectively and efficiently independently of each other. This results in fragmented instructional time. Someone, or some group, must look at the school schedule globally, answering the following questions *before* constructing the schedule:

- ♦ What are the school's instructional priorities?
- ♦ How much time should be allocated for each core subject at each grade level?
- ♦ How much time should be allocated to provide programs in the arts, physical education, technology, foreign language and other encore subjects?
- ♦ When should services (pull-out programs) be provided to students who qualify for or are selected to be involved in special programs? What are the limitations for scheduling these programs (e.g., uniform length, frequency)? What will students miss to attend these programs?
- ♦ How does the scheduling of core subjects relate to the scheduling of encore subjects and special services? How are they integrated?

The difficulty in this task lies in the fact that just as the different programs cannot be scheduled independently, the ques-

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tions we ask cannot be answered independently or without general consideration for some basic scheduling model. Otherwise, we end up with a fragmented list of goals and requirements that no schedule can efficiently and effectively meet.

For example, if we insist (as many have) that all students engage in language arts and reading for the first two-and-a-half hours of the day, it becomes very difficult to provide a sensible plan for the provision of encore classes and special services. Better to ask, “Is there a way for our school to provide about two-and-a-half hours of language arts and reading instruction to all students *and* provide a reasonable plan for providing art, music, PE, special education, and the like? What program compromises would have to be made to accomplish both?” We contend that the scheduling team must take a global view of the school and its needs and design a schedule that keeps the mission of the school central, while still addressing issues of practicality, fairness, and efficiency.

Collaboration

School schedules should be designed to facilitate teacher collaboration, both for planning and for instruction. When art (or PE, music, etc.) classes are scheduled one after another for each of the three first grade teachers, common planning time for these teachers becomes less likely. Also, when one first grade class is scheduled into art class while the other two are having language arts, these teachers find it difficult to regroup students among teachers for specific skill instruction. Research supports our belief that teachers need to collaborate with their colleagues for sustained periods of time within the context of their teaching environment (Iverson, 2003; King & Newman, 2000).

Practicality

School schedules should be designed with practicality in mind. What can we reasonably expect typical classroom teachers (not just superstars) to do? If all teachers were superstars, perhaps self-contained classrooms with totally heterogeneous classes would be a reasonable course of action. But given the accountability demands placed upon teachers for student achievement, is it reasonable to expect all teachers to be experts in all subjects? Is it reasonable to expect that they can differentiate curriculum and instruction for the full range of abilities found in a particular grade level group for six hours a day, 180 days a year? Is it reasonable to think that they can slot effective core instruction into the fragments of time left over after encore classes and pull-outs are scheduled?

We believe that it is time to consider a certain degree of specialization among teachers in elementary schools. We also believe that while the majority of the school day can be spent working with heterogeneous groups, homogeneous, skill-based groups are appropriate for part of the day, specifically when students are being instructed in reading and mathematics. We believe that school should be scheduled with its primary mission (literacy and numeracy) at the forefront; other important activities should be scheduled around these classes, not the reverse. Each of these beliefs supports the notion that an elementary teacher’s job could be made more doable, and that not only the superstars of our profession should attain success in this profession.

Fairness

School schedules should be created with fairness for both students and teachers in mind. Whether students at the same grade level receive equal amounts of science instruction (or time in the computer lab, or time with the teacher in a reading group) should not be left to the preferences of individual teachers. If we decide a particular program or curriculum is desirable for students, then we should guarantee, at the very least, that they have an equal opportunity to learn it. A schedule is a beginning point for this guarantee.

In the past 30 years, many specialized positions have been added to elementary schools to serve students with a variety of needs (special education [SPED], ESL, Title I, etc.) and to provide enrichment activities (e.g., instrumental music lessons). From the vantage point of core classroom teachers, few of these additions have made their jobs any easier, and some have made them more difficult (often because of scheduling).

Furthermore, classroom teachers often see the workload of the school unfairly distributed. They wonder: Why do I work with 25 students at a time and resource teachers with two to five? Why do I begin class the first day of school and they start two weeks later? Why do I teach up to the last day of the year while they stop meeting with students two weeks earlier to do assessments, reports, and other paperwork? On the other hand, resource personnel often feel misunderstood by general education faculty and frequently commiserate together about their paperwork, intransigent parents, looming individual education program (IEP) battles and the ubiquitous threat of the lawsuit. This dysfunctional lack of mutual respect has not helped to integrate the services for students appropriately. Principals must

openly discuss workload issues and help to design a schedule that fairly distributes responsibility.

Efficiency

School schedules should be designed with efficiency in mind. Few school leaders would argue with this statement. We also believe, however, that efficiency should not trump all other criteria for judging a school's effectiveness.

For example, this may be the most efficient way to schedule encore classes: Compute the total number of homeroom classes for a school and assign each encore teacher exactly that number of instructional periods (plus lunch and planning) in that school. So, if a school has 18 homerooms and art is 45 minutes long, assign 18 art periods of 45 minutes to the school. This is very "efficient" in the eyes of the central office administrator charged with assigning encore teachers across the entire district.

Unfortunately, this practice violates nearly all of our previously discussed criteria. It is not mission driven, global, or practical. Under this system, principals almost always create a schedule by sending one first grade class to art, followed immediately by the next, and so on. Yes, on the surface it's efficient and the process can be justified as fair, but we have already documented the problems this scheduling strategy causes. In the long run, we find it more efficient to build in some flexibility; the upfront "efficiency" of allocating staff by the numbers fragments the schedule and leads to great inefficiency in delivery of the core program.

Planning Process and Implementation

While one might think that staff would welcome any improvements to the school schedule, the fact is that what one faculty member sees as an improvement, another may view as a disaster. We recommend a year of study and planning before implementing any significant scheduling change. Typically, a school or school district empowers a study committee to analyze the problems of the current schedule, to set goals for improvement, and to investigate potential solutions and alternatives. This committee generally has representatives from every grade level, from the encore teachers and from special service programs, in addition to administrative representatives from schools and the central office. Often, too, it includes several parents. It is essential that the makeup of the committee mirror the composition of the faculty. It also is essential to include union representation. Planning and implementation of proposed schedule changes are addressed in greater detail in chapter 12.

Organization and Structure of This Book

Part I of this book explores the creation of the major aspects of the elementary school schedule: the master schedule (chapter 2), the encore schedules (chapter 3), and special service schedules (chapter 4). Chapter 5 analyzes the more commonly used departmentalization strategies.

Part II develops what we consider to be the optimal scheduling model for elementary schools: parallel block scheduling (PBS). Chapter 6 introduces the rationale and basic plan for PBS and then develops the model with the express purpose of creating an optimal environment for literacy and numeracy acquisition. Chapter 7 addresses staffing, scheduling, managing, and implementing the “extension center,” a critical and exciting instructional center used in parallel block scheduling. Chapter 8 is devoted to ideas for scheduling mathematics instruction in both traditional and PBS scheduling formats.

Part III of the book is devoted to quality instruction in reading, language arts, and mathematics—concepts that can be used in either traditional or PBS models. In chapter 9, Ruth Short describes the primary literacy classroom; in chapter 10, Karen Broadbush paints a picture of the intermediate literacy classroom. In chapter 11, Laura L. McCullough describes outstanding elementary school mathematics instructional practices. Finally, in chapter 12, Susan W. Golder outlines planning and implementation at the school and district levels.

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2

Designing Elementary School Master Schedules

Given the problems and principles outlined in chapter 1, we begin the task of constructing master schedules. Collaboratively constructing a practical, fair and efficient school-wide plan that embodies the mission of the school is not as linear as the end product might suggest. First and foremost, a master schedule serves to answer two important questions:

1. How should we allocate time among a variety of potential subjects/activities?
2. How should we schedule resources shared by several grade levels? These shared resources include encore teachers and their spaces, special service teachers and their spaces, cafeteria personnel and the lunchroom, and playgrounds.

How Should We Allocate Time in Elementary School?

As discussed in chapter 1, elementary schools have largely left it up to individual teachers to determine how to use their time, working around encore classes, lunch, and recess. In this age of high-stakes testing and accountability, however, it increasingly is likely that such decisions will be made at the school or even district level. Some states specify minimum time requirements for core instruction in elementary school. In Virginia, for example, 75 percent of the school day or a minimum of 560 hours annually must be spent instructing in language arts (including reading), mathematics, science, and social studies (Virginia Department of Education, 2006).

Conflicts arise, however, when district-level personnel specify requirements that principals and teachers consider inappropriate for the context of their individual schools or restrictive when it comes to addressing local issues, needs, and problems.

District personnel are likely to issue such mandates (including time allocations) for the following reasons:

- ◆ to rectify poor performance as indicated by high-stakes testing data; or
- ◆ to prevent poor performance when faced with a new requirement for high-stakes testing; or
- ◆ to establish consistency across the district on some factor (the allocation of time, resources, programs, etc.). In our experience, school district leaders like to be able to state categorically that “*All* elementary school students in this school district receive (fill in the blank),” and they are greatly embarrassed when provided with evidence to the contrary (usually to bolster a parent’s complaint).

The debate over the allocation of time plays out on a smaller political scale (but with greater impact and participation) between school administrators and teachers when school principals attempt to mandate time use to teachers who can always just close their doors and proceed as they choose.

To address this issue, it is necessary to consider both the district’s desire for consistency and the schools’ and teachers’ needs for some level of autonomy. The best way to navigate this divide is to formally discuss it. We recommend the formation of a district committee that includes central office instructional personnel, principals, representative teachers, and perhaps a school board member and/or parent(s) to discuss openly the allocation of the available time to various subjects and activities.

The committee should include several professionals who have what we call the “scheduling gene”—people who can and will temper with reality the philosophical discussion that inevitably develops. There is nothing more frustrating for a group engaged in such a task than to discover, after agreements already have been made, that the negotiated compromise is impractical from a scheduling standpoint.

The entire group must recognize one of the immutable principles of the “physics” of school scheduling: “Any time you put something into the schedule, you must take something out.” All too often, school board members, central office administrators, officials from state departments of education, and even state legislators forget this principle, mandating the inclusion of some pet program (e.g., 30 minutes of PE every day) without specifying how to make room in the schedule for the new initiative.

This scheduling committee should formulate recommendations that answer the following questions:

- ◆ What is the appropriate allocation of available school time to core and encore subjects?
- ◆ Within the core time, what is the appropriate allocation of time among the various subjects (language arts, mathematics, science, and social studies)?
- ◆ What do we want to provide students within the encore block, and how should that time be divided among the selected programs?
- ◆ How should we schedule services provided by learning disabilities (LD), ESL, Title I, and other special service providers?

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- ♦ How should we provide time for intervention, remediation, and enrichment?

The resulting set of guidelines could very well include stipulations that are nonnegotiable from a district standpoint and others that offer site-based choices. In this chapter, we differentiate time only as *core*, *encore*, and *Intervention/Enrichment* (I/E). In the case study that concludes the chapter, we discuss in greater detail one district's compromise between district consistency and site-based autonomy. For purposes of the example to be developed below, we used the time allocations shown in Table 2.1

Table 2.1 Time Allocations

	K	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5
Homeroom	15	15	15	15	15	15
LA/Reading	150	140	140	140	100	100
Math	50	60	60	60	75	75
SS/SC	50	50	50	50	75	75
Encore	50	50	50	50	50	50
Lunch/Recess	50	50	50	50	50	50
Intervention/ Enrichment	50	50	50	50	50	50
Closing	5	5	5	5	5	5
Totals	420	420	420	420	420	420

Note: When the school day has less than 420 minutes, obviously adjustments must be made; for example, lunch/recess and I/E might be shortened to 45 minutes each; homeroom time could be cut to 10 minutes, and so on.

How Should We Share Resources Used by Several Grade Levels?

All grade levels generally are provided the same encore programs, although occasionally the amount of PE, music, or art might differ based on age or program requirements. Obviously then, the personnel and spaces assigned to these programs also must be shared.

Likewise, all grade levels generally are provided the same special services (Title I, special education, etc.), although certain grade levels may require more or less of a particular program. For example, students in kindergarten and first grade tend to be found eligible for speech and language services; by the time these students reach fourth or fifth grade, effective remediation has moved some of them off this list. Conversely, few students are found eligible for LD services in the lower grades, so there generally is a greater need for staff to provide these services in grades 4 and 5. Also, instrumental music programs, if available, usually do not begin until grade 4 or 5.

Finally, most schools have limited space in lunchrooms and in play areas and must stagger classes over time for lunch and recess.

Regardless of the details, one principle does not change: To minimize conflicts over staff and space use, the first step in constructing the schedule is to determine the requirements for all services shared among grade levels.

We have worked in some districts that have issued mandates regarding the scheduling of certain subjects (most notably read-

ing) without considering the impact on the efficient use of resources. For example, a district occasionally will require that all grade levels spend the first 90 minutes of the day in reading instruction. While this policy makes a strong statement about the importance of reading, it ignores the practicalities of efficient scheduling. What are we to do with the art, music, and PE teachers during that time? Give them 90 minutes of planning each day? Have them teach reading, even though they're not trained to do so? Neither option is a wise use of resources. A school, however, could readily comply with a policy requiring 90 minutes of uninterrupted reading sometime during the day, or even during the morning.

From a practical viewpoint, when creating a schedule that is both educationally sound and fiscally efficient, the factors to be considered include the following:

- ◆ the district's recommendations (if any) for the use of time and the provision of encore and special services;
- ◆ the special populations or needs of the school;
- ◆ the number of sections per grade level;
- ◆ the staffing level for both base and encore teachers;
- ◆ the length of the school day; and
- ◆ the available space.

In the sections that follow, we gradually construct a full school schedule that includes a master block schedule built on the time allocations noted in Table 2.1 (p. 21). Each grade level will have designated blocks for encore, Intervention/Enrich-

ment, lunch/recess, language arts, mathematics, science, and social studies.

Creating the Encore Schedule

Because all classes share the spaces and services of encore teachers, we generally start the construction of the schedule with these classes. Our goals here are to construct an encore schedule that

- ◆ respects the needs of the encore disciplines;
- ◆ provides common planning time for teams of core teachers;
- ◆ minimally disrupts the flow of core instruction; and
- ◆ efficiently uses the school's spaces and other resources.

Encore Period Length

As mentioned in chapter 1, teachers of encore classes sometimes disagree about the optimal length of class periods. Some instructors, typically general music and sometimes PE, prefer shorter periods of 25 to 30 minutes, and others, most notably art teachers, prefer longer classes of 45 to 60 minutes. The construction of an encore schedule that meets our goals nearly always requires compromise among encore staff regarding the length of classes. Generally, the compromise period length is somewhere between 40 and 50 minutes, depending mostly on the length of the school day.

Most elementary schools have six grade levels (K–5), so generally we need to have six periods, one for each grade level,

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to schedule encore classes. Two additional periods also are required, one for planning for the encore teachers and one for lunch for the encore teachers. Thus, in most elementary schools we begin with an eight-period schedule as the basic template.

The length of the period depends on the length of the school day. A six-hour school day would allow 45-minute class periods ($360 \div 8 = 45$); six hours and 40 minutes would be required for 50-minute class periods ($400 \div 8 = 50$). With time allowed for passing between classes, the effective length of 45-minute classes is more like 41 or 42 minutes, and the effective length of 50-minute classes is more like 46 or 47 minutes (depending on the distance of classrooms from encore rooms).

Occasionally it is possible to create appropriate schedules with periods of different lengths; in this case, one period is usually half of another. For example, we might schedule hour-long art classes and 30-minute PE and music classes; however, for several reasons this type of schedule is used infrequently. First, the length of the school day usually discourages schools from allocating 60 minutes of instructional time for encore. Second, if equal planning time is allocated to encore teachers, we would need seven hour-long periods plus a lunch period, or a minimum of seven hours and 30 minutes to fit such a plan into the school day. Generally this plan is used only in one of two circumstances: either the school has sufficient encore resources to

serve more than one grade level at a time, or teachers at each grade level forgo planning time one day per cycle.

Encore Period Placement

Once we have determined the length of the period for encore classes, we must decide when during the school day each grade level has encore. This matter usually engenders great debate, because most elementary school teachers would prefer to schedule their encore classes in the afternoon—an impossible task, if efficiency is to be a consideration at all. Consequently, in the sample school illustrated in Figure 2.1 (p. 30),¹ which is based on a seven-hour day with eight 50-minute periods and 20 minutes for homeroom and closing activities, we have eight possibilities for encore periods.

Our bias generally favors students in the earlier grades, whose teachers insist on morning instruction in reading and language arts; we usually allocate afternoon planning/encore periods to primary classes. We avoid assigning either kindergarten or first grade in the last period of the day because five- and six-year-olds take a great deal of time to get ready to depart in the afternoon, especially when mittens, gloves, boots, and heavy coats are involved. Consequently, it is not unusual to allocate the final period of the day to students and teachers in grade 2.

¹ A spreadsheet such as Microsoft Excel serves as a useful tool in detailing such decisions. In the template illustrated here, each cell on the timeline represents five minutes; these cells are merged together to form periods of greater length. For example, ten cells are merged to form encore periods of 50 minutes in length. Once one period of this length is created, it can be

copied and pasted into different locations on the schedule and relabeled as needed. A variety of Excel templates based on different-length cells (three, four, and five minutes) as well as a host of sample complete schedules are available for purchase from schoolschedulingassociates.com.

As is seen in Figure 2.1 (p. 30), we assigned the next-to-last period to grade 1 and the period before that to kindergarten. In our scheduling format, we enter the encore/planning period in two places: once in the row designated for the grade level (labeled *Plan*) and again in the row labeled *Arts/PE*, where we label the period with the grade level served at that time (e.g., grade 1). This practice makes potential conflicts easy to spot.

We set aside lunch time for the encore teachers in the middle of the day, with encore periods for third, fourth, and fifth grades assigned to the morning. Whenever possible, we tend to assign encore teachers planning time first thing in the morning, not so much because they prefer this time, but to ensure that all students begin the day in their core classes. This plan also provides encore teachers with time to set up for their classes.

In schools with a multipurpose room (or the “cafetorinasi-um,” if you prefer!) used for both lunch and physical education classes and a need for several different lunch periods, it becomes necessary to place the encore teachers’ planning period in the middle of the day, adjacent to their lunch period, to ensure that enough time is available to schedule lunch in the multipurpose room. This generally requires that fifth grade sections have encore classes during the first period of the day.

In addition, as discussed in chapter 1, encore teachers usually prefer to meet classes in the same grade level in consecutive periods on the same day (to minimize materials and equipment changes). Because this is incompatible with common grade-level planning time, we at least try to cluster primary classes in adjacent periods and intermediate classes in adjacent periods. In this example, we schedule encore for all primary classes in the afternoon and all intermediate classes in the morning.

Sometimes schools have reasons other than those discussed here for ordering encore periods differently. For example, in some states only specific grade levels are tested, and these grade levels receive preferred scheduling slots. In Virginia, because standards tests have been administered only in grades 3 through 5, we occasionally find schools in which grades 3, 4, and 5 are allocated afternoon encore periods to preserve morning instructional time.

In addition, if a school has a half-day kindergarten program with both A.M. and P.M. sessions, it’s necessary to provide two scheduling slots, one for each session. The kindergarten encore schedule can be handled in two ways. We can assign two encore periods to kindergarten, one in the morning and one in the afternoon; these periods would be the same length as all other grade levels. Kindergarten teachers would alternate their planning time, planning one day in the morning when the morning kindergarten is in encore and the next day in the afternoon, when the afternoon kindergarten attends encore classes. Thus, the kindergarten teachers’ planning time would alternate every other day with the encore teachers’ planning time.

A second option would be to schedule two shorter periods that would meet every day, one for the morning kindergarten and one for the afternoon kindergarten. The kindergarten teachers would have two short breaks daily rather than one longer planning period. Chapter 3 illustrates these exceptions and others.

Encore Rotations

Once we have chosen encore blocks for each group, we must schedule encore classes into these slots. The number of encore classes needed at the same time depends on the number of

homerooms that need to have common planning time—usually the entire grade level. For example, if we hope to give grade 5 teachers common planning time and there are four grade 5 teachers, there must be four places for the classes to go. We call the way we schedule classes into encore during a specific period the “encore rotation.”

Traditionally, encore classes have been scheduled on a Monday-to-Friday schedule, which only works well when there are five classes per grade level and five different encore classes. For reasons discussed previously, we now recommend that encore classes be offered on rotations of three, four, five, six, or eight days that are independent of the days of the week. So in the example mentioned above, if most of the grade levels in the school had four classes, we might employ a four-day rotation such as the following: day 1, PE; day 2, art; day 3, PE; day 4, music. On day 5 the rotation would begin anew.

Figure 2.2 (p. 31) illustrates a four-day rotation for a school with four sections per grade level. Notice that the rotation is moved up one day for each successive teacher; the P-A-P-M rotation begins on day 2 for teacher B, day 3 for teacher C, and so on. Staffing this rotation requires one art teacher, one music teacher and two PE teachers, designated PE-A and PE-B in Figure 2.2.

To complete the encore rotations for the entire school (illustrated in Figure 2.2, p. 31), we must repeat the P-A-P-M rotation, which begins with grade 5 in the 9:05–9:55 slot, in different time slots for every grade level.

Many different rotations are available; a school’s decisions are based in part on what they believe is important to provide students, the number of staff available to provide the classes,

and the certifications/abilities of these persons. Chapter 3 discusses various rotations and several exceptions and special circumstances.

Encore Teachers’ Schedules

Now that encore periods are scheduled and the encore rotation chosen, we can create schedules for the encore teachers. Referring to the rotation (Figure 2.2, p. 31) and the periods allocated to each grade level for encore classes (Figure 2.1, p. 30), we plot the various classes taught by each encore teacher, which is shown in Figure 2.3 (p. 32). Each encore teacher begins the day planning, then works with a fifth grade class, a fourth grade class, and a third grade class. After lunch, encore teachers instruct kindergarten, then first grade, and finish the day with a second grade class.

Adding I/E, Lunch, and Recess Periods, and Academic Blocks

Now the decision-making process becomes considerably less linear. We begin to take a more customized approach as we carefully place academic blocks and the I/E and lunch/recess periods, working back and forth within and between grade levels to preserve solid instructional time as allocated in Table 2.1 (p. 21). Although we may begin this next step by assigning I/E periods to each grade level (Figure 2.4, p. 33), and follow by suggesting lunch and recess periods (Figure 2.5, p. 34), often we must change the original placement of encore classes in the master schedule to achieve the best result. Figure 2.6 (p. 35) shows the final master block schedule, with time allocations respected and large blocks of core instructional time preserved.

The examples detailed in this sequence are relatively simple compared to the complex requirements of programs in many elementary schools, especially with respect to the scheduling of special services. In chapter 4, we set forth various options for scheduling special services, which, in turn, alter and complicate the development of the master schedule. For now, we move on to a case study of one large school division that implemented many facets of this plan.

Case Study: Prince William County, Virginia Public Schools

In spring 2002, in consultation with one of the authors of this book, the elementary schools of Prince William County, Virginia, set out to implement many of the approaches described above. In the past, all 50 elementary schools had operated somewhat independently. The Prince William County Schools had a long tradition of site-based management, with significant programmatic and financial autonomy for each school. There were minimal recommended time allocations for core and encore classes; basic encore staffing gave each homeroom group one 30-minute period each of physical education and music weekly and one 60-minute period of art every two weeks, but common planning time during the school day was rare, although many schools had an early dismissal every week to allow teachers to collaborate. Other funds for additional staffing were used at the discretion of the individual schools.

After an initial presentation of the ideas discussed above and several visits to schools outside the district with scheduling

plans similar to the one under consideration, ten schools in the district decided to pilot new schedules. Schools worked closely with the outside consultant and the central office staff member who assigned encore personnel to develop appropriate encore rotations. Several schools shared encore teachers on new formats, including four-day, six-day, and eight-day rotations. Each of the schools managed to schedule common planning time for all their teachers. Times for various core subjects still were allocated based on individual school preferences. The Intervention/Enrichment period was not part of this pilot.

After two years of the pilot, survey data and reports from the individual schools were so positive that a decision was made to expand the effort to include all elementary schools in the county. Several additional factors had to be considered, though:

- ◆ The district was moving away from the weekly early dismissal, thereby increasing the need for common planning time during the school day.
- ◆ There was a desire to increase the amount of physical education, music, and art received by students.
- ◆ There was a desire to provide an elementary program in both the core and encore classes that was more equitable across all schools.
- ◆ State and federal accountability programs precipitated a need to provide time for instructional interventions, remediation, and re-teaching.
- ◆ An elementary strings program had been introduced in the fifth grade, and the scheduling format for the program (rotating pull-outs from all classes) was

found to be a new and aggravating source of instructional fragmentation for fifth grade teachers and students.

In the late winter and spring of 2004, a district-wide committee met to plan for implementation of the new scheduling format across the district. The committee included representatives from the ten pilot schools and from many of the additional 40 schools that would be implementing the new format the next fall. School-based representatives, including administrators, guidance counselors, core teachers, encore teachers, and special service providers, were joined by representatives from central office.

Table 2.2 Time Allocations

Grades K–2	Minutes	Grades 3–5	Minutes
LA/R	120	LA/R	90
Math	90	Math	75
SS/SC	45	SS/SC	90
Encore/Plan	45	Encore/Plan	45
I/E	45	I/E	45
Lunch/Recess	45	Lunch/Recess	45
Total	390	Total	390

After reviewing the fundamental ideas of the proposed scheduling format, we addressed the first basic question: How should we allocate time in the school day? After a lively discussion, we agreed on the allocation shown in Table 2.2.

One reason why high school and middle school scheduling is more straightforward (easier) than elementary school scheduling is that all the periods generally are the same length. While we don't advocate forcing elementary schools into such a structure, there are minor changes to time allocations and period length that can make the schedule much easier to construct. Notice that the greatest common factor of all the possible allocated class lengths (45, 75, 90, and 120 minutes) in this example is 15. Similarly, a schedule with suggested periods of 40, 80, and 100 minutes would have a greatest common factor of 20. Our experience scheduling hundreds of schools has led us to formulate the following rule: "The higher the greatest common factor and the closer it approaches a standard period length, the easier it will be to construct a schedule." Thus a schedule with periods having a greatest common factor of 20 is easier to construct than one for which the greatest common factor is 15. Similarly, when the greatest common factor is smaller, say 5 minutes, in the case where suggested periods are 45, 60, and 80 minutes, the scheduling puzzle is more difficult. There must be a balance between the practicalities of a schedule and the mission-driven desire for particular time allocations; period length is one of the practicalities that must be considered.

The second issue to be decided was the allocation of time in the 45-minute encore period. How much physical education, art, music, and other encore classes should students receive? Huge variety existed in the schools of the county. Some schools gave students one PE class per week; others gave three. Innovative encore classes were provided in different schools, including the following: library media, computer lab, foreign language, reading, science lab, math lab, and guidance. Several of these programs were either important to the school or necessary to main-

tain its identity. To complicate the process of change, schools had acquired staff to meet these varying programmatic emphases. So how could the district attain some level of standardization without undoing programs that were valued and/or needed? After much debate, the committee agreed on the following standard:

Instructional time in art, music, physical education, and other encore subjects (as determined by the school) for grades 1–5 shall be 45 minutes. Schools shall schedule art, music, and physical education to meet at least once in six days. These classes may meet more frequently, every three, four, or five days. Half-day kindergarten students shall receive instruction in art, music, and physical education as part of the rotation block with half the frequency of grades 1–5. (Prince William County Public Schools, 2004)²

This regulation left room for schools to insert other subjects into the rotation to meet the individual needs of their school, as long as they allocated the minimum one day in six to PE, art, and music. This regulation also opened up the door for encore rotations other than the standard Monday-to-Friday schedule, such as four-day, five-day, six-day, eight-day, and even 12-day rotations, so long as at least one day of every six days students had a period of PE, music, and art.

One benefit of four-, six-, and eight-day rotations was that it simplified the sharing of teachers across schools. For example,

if two schools with three sections each both operated a six-day rotation, itinerant teachers could be shared more easily, with the art and music teachers switching schools every three days. (In chapter 3 these rotations are discussed in great detail.)

A debate occurred as to how best to implement the strings program at fifth grade. As mentioned previously, the strings teacher would work in the school one or more days a week by pulling out groups on a rotating schedule so that a different class was missed each session. For the grade 5 classroom teachers, this practice resulted in a day or two every week during which small groups left and returned to the classroom all day long—a maddening circumstance, especially since fifth grade is a testing year in language arts, math, science, and social studies.

Our negotiated solution was to designate each elementary school in the district as an “early morning,” “midday,” or “late afternoon” strings school. We required “early morning” strings schools to schedule encore and I/E consecutively in periods 1 and 2, “late afternoon” schools in periods 7 and 8, and “midday” schools in periods 4 and 5. A strings teacher then visited each school as many days as necessary to serve the number of groups created, but only during the two assigned periods. Strings teachers had to travel midday, but that seemed a small price to pay to minimize interruptions during core fifth grade instruction.

As Figure 2.7 (p. 36) shows, the master schedule for Antietam Elementary School faithfully fulfills the time allocations agreed upon in the district (Table 2.2, p. 27). Note that the sched-

2 Effective for the 2006–07 school year, the regulation was changed to require a minimum of two physical education periods every six days (not reflected in the included policy for 2004); one music and one art period

still are required every six days. The full text of the original policy is included in Appendix 3.

ule includes no “slivers” of time; the shortest period is 30 minutes. This schedule was negotiated with the principal, with representatives from each grade level, encore, and special services involved in the talks.

The school decided on an eight-day rotation, with PE, music, and art every four days and library and computer lab every eight days (Figure 2.8, p. 37). Notice that the master schedule (Figure 2.7, p. 36) includes separate encore blocks for the morning and afternoon kindergartens; the kindergarten teachers alternate planning in the morning and the afternoon every other day. Half-day kindergarten students receive half as many encore classes as students in grades 1–5.

Figure 2.9 (p. 38) illustrates the encore schedules; note that in addition to their regularly scheduled classes, both the library and the computer lab have large blocks of uninterrupted open time during which other classes could return to these venues accompanied by their homeroom teachers for research, keyboarding, or other appropriate activities.

So far, we only have hinted at the breadth and complexity of designing elementary school schedules. In chapter 3, we explore the many possibilities for encore class scheduling. In chapter 4, we develop a variety of scenarios for providing special services, and in chapter 5 we detail a variety of departmentalized teaming models.

References

- Prince William County Public Schools (2004). *Regulation 602.1, instruction: Elementary instructional day*. Manassas, VA: Author.
- Virginia Department of Education (2006). *Standards for accrediting public schools in Virginia*. 8 VAC 20-131-80. Richmond, VA: Author.

**Figure 2.1 Encore/Planning Time Period Assignment
(School Day Divided into 5-Minute Increments)**

	ENCORE/PLANNING TIME PERIOD ASSIGNMENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Figure 2.2 Encore Rotations

8:15-9:05		Encore Plan				11:35-12:25	Encore Lunch/Duty				
		Day 1	Day 2	Day 3	Day 4						
9:05-9:55	5A	PE-A	Art	PE-A	Music	12:25-1:15		Day 1	Day 2	Day 3	Day 4
	5B	Music	PE-A	Art	PE-A		KA	PE-A	Art	PE-A	Music
	5C	PE-B	Music	PE-B	Art		KB	Music	PE-A	Art	PE-A
	5D	Art	PE-B	Music	PE-B		KC	PE-B	Music	PE-B	Art
							KD	Art	PE-B	Music	PE-B
		Day 1	Day 2	Day 3	Day 4						
9:55-10:45	4A	PE-A	Art	PE-A	Music	1:15-2:05		Day 1	Day 2	Day 3	Day 4
	4B	Music	PE-A	Art	PE-A		1A	PE-A	Art	PE-A	Music
	4C	PE-B	Music	PE-B	Art		1B	Music	PE-A	Art	PE-A
	4D	Art	PE-B	Music	PE-B		1C	PE-B	Music	PE-B	Art
							1D	Art	PE-B	Music	PE-B
		Day 1	Day 2	Day 3	Day 4						
10:45-11:35	3A	PE-A	Art	PE-A	Music	2:05-2:55	2A	PE-A	Art	PE-A	Music
	3B	Music	PE-A	Art	PE-A		2B	Music	PE-A	Art	PE-A
	3C	PE-B	Music	PE-B	Art		2C	PE-B	Music	PE-B	Art
	3D	Art	PE-B	Music	PE-B		2D	Art	PE-B	Music	PE-B

2.1
2.2

Figure 2.3 Encore Teacher Schedules

PE Schedule (2 Teachers)															
	8:00		9:00		10:00		11:00		12:00		1:00		2:00		3:00
Arts/PE		Plan	Grade 5	Grade 4	Grade 3	Lunch/Duty	Kindergarten	Grade 2	Grade 1						
Day 1		Plan	5A, 5C	4A, 4C	3A, 3C	Lunch/Duty	KA, KC	1A, 1C	2A, 2C						
Day 2		Plan	5B, 5D	4B, 4D	3B, 3D	Lunch/Duty	KB, KD	1B, 1D	2B, 2D						
Day 3		Plan	5A, 5C	4A, 4C	3A, 3C	Lunch/Duty	KA, KC	1A, 1C	2A, 2C						
Day 4		Plan	5B, 5D	4B, 4D	3B, 3D	Lunch/Duty	KB, KD	1B, 1D	2B, 2D						
Art Schedule															
	8:00		9:00		10:00		11:00		12:00		1:00		2:00		3:00
Arts/PE		Plan	Grade 5	Grade 4	Grade 3	Lunch/Duty	Kindergarten	Grade 2	Grade 1						
Day 1		Plan	5D	4D	3D	Lunch/Duty	KD	1D	2D						
Day 2		Plan	5A	4A	3A	Lunch/Duty	KA	1A	2A						
Day 3		Plan	5B	4B	3B	Lunch/Duty	KB	1B	2B						
Day 4		Plan	5C	4C	3C	Lunch/Duty	KC	1C	2C						
Music Schedule															
	8:00		9:00		10:00		11:00		12:00		1:00		2:00		3:00
Arts/PE		Plan	Grade 5	Grade 4	Grade 3	Lunch/Duty	Kindergarten	Grade 2	Grade 1						
Day 1		Plan	5B	4B	3B	Lunch/Duty	KB	1B	2B						
Day 2		Plan	5C	4C	3C	Lunch/Duty	KC	1C	2C						
Day 3		Plan	5D	4D	3D	Lunch/Duty	KD	1D	2D						
Day 4		Plan	5A	4A	3A	Lunch/Duty	KA	1A	2A						

Figure 2.4 Intervention/Enrichment Period

		Add the Intervention/Enrichment Period																											
		8:00																											
Kinder																													
Grade 1																													
Grade 2																													
Grade 3																													
Grade 4																													
Grade 5																													
Intervention/Enrichment																													
Arts/PE Teachers																													

2.3
2.4

Figure 2.5 Lunch and Recess

	8:00		9:00		10:00		11:00		12:00		1:00		2:00		3:00
Kinder.	HR							Lunch/ Recess (50)			Plan (50)	Intervention/ Enrichment (50)			
Grade 1	HR								Lunch/ Recess (50)	Intervention/ Enrichment (50)	Plan (50)				
Grade 2	HR							Recess/ Lunch (50)	Intervention/ Enrichment (50)					Plan (50)	
Grade 3	HR							Plan (50)	Recess/ Lunch (50)					Intervention/ Enrichment (50)	
Grade 4	HR				Intervention/ Enrichment (50)	Plan (50)					Lunch/ Recess (50)				
Grade 5	HR				Plan (50)	Intervention/ Enrichment (50)					Recess/ Lunch (50)				
Intervention/ Enrichment			Plan (50)	Grade 4	Grade 5	Lunch/ Duty (40)	Grade 2		Grade 1	Kindergarten	Grade 3				
Arts/PE Teachers			Plan (50)	Grade 5	Grade 4	Grade 3	Lunch/Duty (50)	Kindergarten	Grade 2	Grade 1					

Figure 2.6 Core Instructional Blocks

2.5
2.6

	8:00		9:00		10:00		11:00		12:00		1:00		2:00		3:00
Kinder.	HR	Language Arts (150 Minutes)				Lunch/ Recess (50)		Math (50)	Plan (50)	Intervention/ Enrichment (50)	SS/SC (50)				
Grade 1	HR	Language Arts (140 Minutes)				Math (60)		Lunch/ Recess (50)	Intervention/ Enrichment (50)	Plan (50)	SS/SC (50)				
Grade 2	HR	Language Arts (140 Minutes)				Recess/ Lunch (50)		Intervention/ Enrichment (50)	Math (60)		SS/SC (50)	Plan (50)			
Grade 3	HR	Language Arts (90 Minutes)		Math (60)		Plan (50)		Recess/ Lunch (50)	LA (50)	SS/SC (50)	Intervention/ Enrichment (50)				
Grade 4	HR	Math (50)	Intervention/ Enrichment (50)	Plan (50)		Language Arts (100 Minutes)			Lunch/ Recess (50)	Math/SS/SC (100)					
Grade 5	HR	Math (50)	Plan (50)	Intervention/ Enrichment (50)	Language Arts (100 Minutes)			Recess/ Lunch (50)	Math/SS/SC (100)						
Intervention/ Enrichment		Plan (50)	Grade 4	Grade 5	Lunch/ Duty (40)	Grade 2		Grade 1	Kindergarten	Grade 3					
Arts/PE Teachers		Plan (50)	Grade 5	Grade 4	Grade 3	Lunch/Duty (50)	Kindergarten	Grade 2	Grade 1						

Figure 2.7 Antietam Master Schedule

	8:45		9:45		10:45		11:45		12:45		1:45		2:45		3:45
Kinder	AM C re nstructi n 135					Enc re/CE 45	Lunch 30	Enc re/CE 45	PM C re nstructi n 135						
Grade 1	Language Arts 120				Math 90			L/ 45	C/E 45	SS/SC 45		Enc re 45			
Grade 2	Language Arts 120				Math 30	L/ 45		Math 0		Enc re 45	C/E 45		SS/SC 45		
Grade 3	Language Arts 90			C/E 45		L/ 45		Math 5		SS/SC 45	Enc re 45		SS/SC 45		
Grade 4	SS/SC 45	Enc re 45		Language Arts 90			L/ 45		Math 5		SS/SC 45		C/E 45		
Grade 5	Enc re 45	C/E 45		Math 5			L/ 45		Language Arts 90			SS/SC 90			
/E	Plan 45	5th Grade		3rd Grade		K a		Lunch 30	K	1st Grade		2nd Grade		4th Grade	
Arts/PE	5th Grade	4th Grade		Plan 45		K/Duty		Lunch 30	K/Duty	2nd Grade		3rd Grade		1st Grade	

Figure 2.8 Antietam Encore Rotations

		Day 1	Day 2	Day 3	Day 4	Day 5	Day	Day	Day 8
8:45-9:30	5A	PE	Art	Music	L	PE	Art	Music	CL
	5B	L	PE	Art	Music	CL	PE	Art	Music
	5C	Music	L	PE	Art	Music	CL	PE	Art
		Day 1	Day 2	Day 3	Day 4	Day 5	Day	Day	Day 8
9:30-10:15	4A	PE	Art	Music	L	PE	Art	Music	CL
	4B	L	PE	Art	Music	CL	PE	Art	Music
	4C	Music	L	PE	Art	Music	CL	PE	Art
	4D	Art	Music	L	PE	Art	Music	CL	PE
10:15-11:00	Specialists' Planning								
		Day 1	Day 2	Day 3	Day 4	Day 5	Day	Day	Day 8
11:00-11:45	KA	PE		Art		Music		CL/L	
	KB	Art		Music		CL/L		PE	
11:45-12:15	Specialists' Lunch								
		Day 1	Day 2	Day 3	Day 4	Day 5	Day	Day	Day 8
12:15-1:00	KA		PE		Art		Music		CL/L
	KB		CL/L		PE		Art		Music
1:00-1:45		Day 1	Day 2	Day 3	Day 4	Day 5	Day	Day	Day 8
	2A	PE	Art	Music	CL	PE	Art	Music	L
	2B	CL	PE	Art	Music	L	PE	Art	Music
	2C	Music	CL	PE	Art	Music	L	PE	Art
	2D	Art	Music	CL	PE	Art	Music	L	PE
1:45-2:30		Day 1	Day 2	Day 3	Day 4	Day 5	Day	Day	Day 8
	3A	PE	Art	Music	CL	PE	Art	Music	L
	3B	CL	PE	Art	Music	L	PE	Art	Music
	3C	Music	CL	PE	Art	Music	L	PE	Art
	3D	Art	Music	CL	PE	Art	Music	L	PE
2:30-3:15		Day 1	Day 2	Day 3	Day 4	Day 5	Day	Day	Day 8
	1A	PE	Art	Music	CL	PE	Art	Music	L
	1B	CL	PE	Art	Music	L	PE	Art	Music
	1C	Music	CL	PE	Art	Music	L	PE	Art
	1D	Art	Music	CL	PE	Art	Music	L	PE

Figure 2.9 Encore Schedules

	Antieta PE Schedule																					
	8:45			9:45			10:45			11:45			12:45			1:45			2:45			3:45
Day 1	5A		4A		Plan		KA		Lunch				2A		3A		1A					
Day 2	5B		4B		Plan				Lunch		KA		2B		3B		1B					
Day 3	5C		4C		Plan				Lunch				2C		3C		1C					
Day 4			4D		Plan				Lunch		KB		2D		3D		1D					
Day 5	5A		4A		Plan				Lunch				2A		3A		1A					
Day	5B		4B		Plan				Lunch				2B		3B		1B					
Day	5C		4C		Plan		KB		Lunch				2C		3C		1C					
Day 8			4D		Plan				Lunch				2D		3D		1D					
Antieta Art Schedule																						
	8:45			9:45			10:45			11:45			12:45			1:45			2:45			3:45
Day 1			4D		Plan		KB		Lunch				2D		3D		1D					
Day 2	5A		4A		Plan				Lunch				2A		3A		1A					
Day 3	5B		4B		Plan		KA		Lunch				2B		3B		1B					
Day 4	5C		4C		Plan				Lunch		KA		2C		3C		1C					
Day 5			4D		Plan				Lunch				2D		3D		1D					
Day	5A		4A		Plan				Lunch		KB		2A		3A		1A					
Day	5B		4B		Plan				Lunch				2B		3B		1B					
Day 8	5C		4C		Plan				Lunch				2C		3C		1C					

Figure 2.9 Encore Schedules, cont'd

2.9

Antieta Li rary Schedule																			
	4		4		1 4		11 4		12 4		1 4		2 4		3 1				
Day 1			4	Plan		nc													
Day 2			4	Plan		nc	I oo												
Day 3			4D	Plan		nc													
Day 4			4	Plan		nc													
Day 5				Plan	I oo	nc		2	3	1									
Day				Plan		nc		2	3	1									
Day				Plan	oo	nc		2D	3D	1D									
Day 8				Plan		nc		2	3	1									
n e a o er a c e le																			
	4		4		1 4		11 4		12 4		1 4		2 4		3 1				
Day 1				Plan		nc		2	3	1									
Day 2				Plan		nc	oo	2	3	1									
Day 3				Plan		nc		2D	3D	1D									
Day 4				Plan		nc		2	3	1									
Day 5			4	Plan	oo	nc													
Day			4	Plan		nc													
Day			4D	Plan	oo	nc													
Day 8			4	Plan		nc	oo												

Figure 2.9 Encore Schedules, cont'd

	Antietam Music Schedule																											
	8:45		9:45		10:45		11:45		12:45		1:45		2:45		3:45													
Day 1	5C		4C		Plan				Lunch				2C		3C		1C											
Day 2			4D		Plan				Lunch				2D		3D		1D											
Day 3	5A		4A		Plan		KB		Lunch				2A		3A		1A											
Day 4	5B		4B		Plan				Lunch				2B		3B		1B											
Day 5	5C		4C		Plan		KA		Lunch				2C		3C		1C											
Day			4D		Plan				Lunch		KA		2D		3D		1D											
Day	5A		4A		Plan				Lunch				2A		3A		1A											
Day 8	5B		4B		Plan				Lunch		KB		2B		3B		1B											